

U.S.S.N. 10/656,586

Remarks

Thorough examination by the Examiner is noted and appreciated.

The claims have been amended to further clarify Applicants disclosed and claimed invention and define over the prior art.

No new matter has been added.

For example, support for the amendments is found in the originally and previously presented claims, the Figures (including Figure 2), and in Specification.

Claim Rejections under 35 USC 103

1. Claims 1, 2, 21-28, and 31-34 stand rejected under 35 USC 103(a), as being unpatentable over Masuda et al. (US PUB 2002/0000197) in view of Ohta (US 4,526,132).

Masuda et al. show a schematic representation of a showerhead 12 Figure 2 that is only described as "having small holes so that the raw material gas introduced into the gas

U.S.S.N. 10/656,586

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OCT 27 2008

storing chamber 18 passes through the small holes of the shower plate 12 and sprayed into the reactor chamber" (see paragraph 0088, 0111, 0121).

Masuda et al. nowhere suggests or discloses how the showerhead 12 is installed. Masuda et al. nowhere describes that the showerhead engages the chamber wall or if a confinement structure is used to direct the gas from the gas storage space 18 through the showerhead. In any event, assuming *arguendo* that **one may conclude from the schematic shown** in Masuda et al. that the **showerhead engages the chamber wall**, as Examiner argues, Masuda et al. nowhere suggests or discloses how the showerhead 12 is installed.

Examiner admits that "it is true that Masuda et al. **does not disclose how the shower head is installed**", but argues that the showerhead indeed engages the wall. Examiner argues that one of ordinary skill "would conclude that the showerhead engages the chamber so that gas is supplied only from the holes of the showerhead."

Yet Examiner ignores the fact that the showerhead may be held to engage the wall by methods including those disclosed by

U.S.S.N. 10/656,586

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OCT 27 2008

Applicants as the prior art:

[0007] A typical conventional CVD (chemical vapor deposition) system is illustrated schematically by reference numeral 10 in FIG. 1. The CVD system 10 generally includes an enclosure assembly 6, having a vertically-movable wafer support pedestal 12 disposed beneath a showerhead 30, through which process gases enter a vacuum chamber 15. A pumping plate 17 may extend around the wafer support pedestal 12 for discharging process gases and other plasma residue from the chamber 15 and into a pumping channel 14 partially circumscribing the chamber 15, as indicated by the arrows 21.

The **absence of any disclosure** as to how the showerhead is supported in Masuda et al., including the fact that Masuda et al. recognize no problem associated with supporting the showerhead (including to engage the chamber wall) **provides no motivation to modify Masuda et al.**

Thus, Masuda et al. nowhere recognizes or suggests a solution to the problem that Applicants have recognized and solved by their claimed invention:

"An apparatus to reduce particle contamination to a semiconductor device process chamber interior by thermal cycling of fasteners"

U.S.S.N. 10/656,586

Masuda et al. nowhere discloses or suggest:

**"a plurality of exterior fasteners extending through and penetrating said chamber wall into said chamber interior and into said showerhead."**

In contrast, Ohta discloses a discharger 37 mounted on a flange 39 (see Figure 2, 3 and 4) where holes 51 are provided so that a screwing bolt 52 can be screwed through the hole 51 (col 3, lines 55-60; col 4; lines 12-23), **penetrate and extend through a lip of the protrusion tube 30a to remain exterior to the chamber; i.e., the bolt 52 does not extend through and penetrate the chamber wall into the chamber interior (see Figures 3 and 4).**

i.e., **"Flange 39 is fixed to protrusion tube 30A of bell jar 30 by screwing bolt 52 into screw hole 51, so that opening 53 of protrusion tube 30A can be sealed. At this time, a sealing member such as rubber made O-ring 55 is fitted in a ring-shaped groove which is formed on the inner surface of flange 39, and thus protrusion tube 30a and flange 39 are fixedly joined to be airtight"** (see col 4, lines 12-19).

Thus, even assuming *arguendo*, a proper motivation modifying Masuda et al. based on the teachings of Ohta i.e., attaching the showerhead of Masuda et al. with the flange bolts and holes of Ohta (**penetrate and extend through a lip of the protrusion tube**

U.S.S.N. 10/656,586

30a to remain exterior to the chamber) would not produce Applicants invention.

Examiner asserts that "the motivation for attaching the showerhead of Masuda et al. with the lateral screws of Ohta, through the chamber wall into the showerhead, is to provide a means of mounting the showerhead of Masuda et al. as required by Masuda et al., but not described".

Examiner does not claim a means of mounting the showerhead, but rather claims a particular mounting structure. Nevertheless, as noted above, any means of mounting the showerhead by Masuda et al. could be by lateral supports as described by Applicants as the prior art. Moreover, Ohta nowhere discloses or suggests a means for mounting a showerhead, but disclose a means for mounting a flange on a protrusion tube where the mounting means remains exterior to the chamber.

Examiner ignores the fact that the lateral screws of Ohta do not extend from an exterior of said process chamber through and penetrate said chamber wall into said process chamber interior and into said showerhead, as Applicants claim, but rather penetrate and extend through a lip of the protrusion tube 30a to

U.S.S.N. 10/656,586

**remain exterior to the chamber.**

Examiner argues in response that the problem Applicants have recognized and solved and nowhere recognized by Masuda et al. "An apparatus to reduce particle contamination to a semiconductor device process chamber interior by thermal cycling of fasteners" is an **intended use** of the apparatus and is **inherent** in the connection taught by Ohta.

Applicants reject any claim of inherency and respectfully request Examiner provide evidence or support establishing such **inherency**. It is clear that if the penetrating bolts remain exterior to the chamber of Ohta that they could not perform the operable function of the structure claimed by Applicants, and are therefore clearly not **inherent** in the connection taught by Ohta.  
See MPEP 2112:

**EXAMINER MUST PROVIDE RATIONALE OR EVIDENCE TENDING TO SHOW INHERENCY**

The fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art); *In re Oelrich*, 666 F.2d 578, 581-82, 212 USPQ 323, 326 (CCPA 1981). "To establish inherency, the extrinsic evidence 'must make

U.S.S.N. 10/656,586

clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.' " *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999)

Rather, the disclosure of Ohta demonstrates that such asserted inherency does not exist since the mounting bolts of Ohta are **specifically designed not to penetrate the chamber wall into the chamber interior** which would make the sub-atmospheric processing chamber of Ohta **unworkable**.

Thus, Modifying the process chamber of Masuda et al. with the structure of Ohta (bolts penetrating a lip of a protrusion portion of the chamber wall to remain on the exterior of the chamber) would not accomplish what Examiner alleges the showerhead of Masuda et al. requires (i.e., would not support the showerhead of Masuda et al. **since it does not penetrate into the chamber interior**) and thus would apparently leave the showerhead of Masuda et al. **unsupported** making it **unsatisfactory for its intended purpose**.

Examiner argues that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated

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OCT 27 2008

U.S.S.N. 10/656,586

into the structure of the primary reference. However, the modification must not make the primary reference **unsatisfactory for its intended purpose**. See MPEP 2145:

**III. ARGUING THAT PRIOR ART DEVICES  
ARE NOT PHYSICALLY COMBINABLE**

"The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference.... Rather, the test is what the combined teachings of those references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). See also *In re Sneed*, 710 F.2d 1544, 1550, 218 USPQ 385, 389 (Fed. Cir. 1983) ("[I]t is not necessary that the inventions of the references be physically combinable to render obvious the invention under review."); and *In re Nievelt*, 482 F.2d 965, 179 USPQ 224, 226 (CCPA 1973) ("Combining the teachings of references does not involve an ability to combine their specific structures."). However, the claimed combination cannot change the principle of operation of the primary reference or render the reference inoperable for its intended purpose. See MPEP § 2143.01.

"**First**, there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second**, there must be a **reasonable expectation of success**. **Finally**, the prior art reference (or references when combined) **must teach or suggest all**



U.S.S.N. 10/656,586

**the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

2. Claims 3, 5, 29, 30, 35 and 36 stand rejected under 35 USC 103(a), as being unpatentable over Masuda et al. in view of Ohta, above, and further in view of Lilleland et al. (US 6,073,577).

Applicants reiterate the comments made above with respect to Masuda et al. in view of Ohta.

Even assuming *arguendo* a proper motivation for modifying the reaction chamber of Ohta based on the teachings of Lilleland et al., the fact that Lilleland et al. disclose a showerhead electrode (10) and one or more baffle plates (22) above the showerhead electrode (10) and a confinement ring (17) (Figure 1), and **nowhere suggests or disclose how the showerhead electrode or showerhead electrode assembly is mounted in a process chamber**, does not further help Examiner in producing Applicants invention.

In addition, it is noted that modifying Masuda et al. with

U.S.S.N. 10/656,586

the confinement ring of Lilleland et al. **would ensure that the showerhead of Masuda et al. would not engage the reactor walls,** as the confinement ring of Lilleland et al. or dielectric annular ring 18 (being exterior to the shower head 10) would engage the chamber walls (see col 2, lines 49-54) in the modified structure of Masuda et al., thus further ensuring that such modification does not produce Applicants invention.

**"First,** there must be some **suggestion or motivation,** either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. **Second,** there must be a **reasonable expectation of success.** **Finally,** the prior art reference (or references when combined) **must teach or suggest all the claim limitations.** The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

A prior art reference must be considered in its entirety, i.e., as a whole including portions that would lead away from the claimed invention." *W.L. Gore & Associates, Inc., Garlock, Inc.,*

U.S.S.N. 10/656,586

721 F.2d, 1540, 220 USPQ 303 (Fed Cir. 1983), cert denied, 469 U.S. 851 (1984).

3. Claims 1, 2, 21-28, and 31-34 stand rejected under 35 USC 103(a), as being unpatentable over Masuda et al., above, in view of Graves (4,331,352) and Ohta, above.

Applicants reiterate the comments made above with respect to Masuda et al. and Ohta.

In non-analogous art, Graves discloses a structure for supporting and constraining opposed members of a heat exchange frame where high temperature portions of the **heat exchanger** are thermally isolated from the frame.

Examiner refers to Figure 5 where an unlabeled bolt on the manhole cover 30b is shown extending into the interior of manway flange 28b (see also Figure 2 which shows the unlabeled bolts on the periphery of the manhole cover. Note that the manhole cover 28B covers air ducts e.g., 24b (Figure 1) that form a portion of the core 12 of the heat exchanger (see col 3, lines 55-60; col 4, lines 46-55).

U.S.S.N. 10/656,586

Examiner states that "Graves teaches a manhole cover 30b which is part of the chamber wall and a manway flange 28B which is interior to the manhole cover 30B. The manway flange 28B has a lateral surface that engages the inner surface of the manhole cover of the chamber wall, and a fastener physically separated from the chamber interior and prevents contamination of the chamber caused by thermal cycling of the fastener". Since the manhole covers air ducts e.g., 24b, it is not clear what chamber Examiner is referring to. The chamber cannot be both the air ducts e.g., 24b and the housing 32 of the heat exchanger, which nevertheless both are non-analogous art to a semiconductor device vapor deposition chamber, an ashing chamber and/or an etching chamber as claimed by Applicants.

Examiner nowhere explains where Graves discloses or suggests:

**"a plurality of exterior fasteners extending from an exterior of said process chamber through and penetrating said chamber wall"**

Examiner argues that Graves is analogous art "since it is directed to the same problem of attaching an **interior part of an apparatus to a chamber wall with a fastener**". Examiner misstates

U.S.S.N. 10/656,586

the problem that Applicants invention has solved and further, Examiner has inconsistently identified the manway cover as part of a chamber wall to which the manway flange is attached, where the manway flange cannot be said to be interior to the chamber (where the 'chamber' must be the inside of the air duct e.g., 24b since the manhole cover covers the duct and Examiner has identified the manway cover as part of the 'chamber' wall. Despite internally inconsistent identification of what the "chamber" is in Gravers, nevertheless, Examiner is clearly mistaken that the heat exchanger of Graves is in the **same field of endeavor** as a process chamber "selected from the group consisting of a vapor deposition chamber, an ashing chamber and an etching chamber;" or addresses any problems that are commonly associated between a process chamber as Applicants claim and a heat exchanger.

**2141.01(a) Analogous and Nonanalogous Art**

**TO RELY ON A REFERENCE UNDER 35 U.S.C. 103, IT MUST BE ANALOGOUS PRIOR ART**

The examiner must determine what is "analogous prior art" for the purpose of analyzing the obviousness of the subject matter at issue. "In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must **either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned.**" *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). See also *In re Deminski*, 796 F.2d 436, 230 USPQ 313

U.S.S.N. 10/656,586

(Fed. Cir. 1986); *In re Clay*, 966 F.2d 656, 659, 23 USPQ2d 1058, 1060-61 (Fed. Cir. 1992) ("A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, **logically would have commended itself to an inventor's attention in considering his problem.**"); and *Wang Laboratories Inc. v. Toshiba Corp.*, 993 F.2d 858, 26 USPQ2d 1767 (Fed. Cir. 1993).

Nevertheless, modifying Masuda et al. with the bolts extending through the manhole cover 30b which covers air ducts (e.g., 24b) into a manway flange 28b (not interior to a chamber of which the manhole covers form a chamber wall i.e., air ducts) and where the bolts **do not penetrate a chamber wall into a structure interior to the chamber**, such modification does not produce Applicants invention.

"Office personnel must rely on the applicant's disclosure to properly determine the meaning of terms used in the claims." *Markman v. Westview Instruments*, 52 F.3d 967, 980, 34 USPQ2d 1321, 1330 (Fed. Cir.) (en banc), *aff 'd*, U.S. , 116 S. Ct. 1384 (1996).

"**First**, there must be some **suggestion or motivation**, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the

U.S.S.N. 10/656,586

reference or to combine reference teachings. **Second**, there must be a **reasonable expectation of success**. **Finally**, the prior art reference (or references when combined) **must teach or suggest all the claim limitations**. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure." *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

A prior art reference must be considered in its entirety, i.e., as a whole including portions that would lead away from the claimed invention." *W.L. Gore & Associates, Inc., Garlock, Inc.*, 721 F.2d, 1540, 220 USPQ 303 (Fed Cir. 1983), cert denied, 469 U.S. 851 (1984).

#### Response to Examiners Arguments

Applicants have responded to Examiners arguments pertinent to the rejection in the body of the response.

#### Conclusion

The cited references, either individually or in combination, do not produce or suggest Applicants invention, and are therefore insufficient to make out a *prima facie* case of obviousness with

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U.S.S.N. 10/656,586

OCT 27 2008

respect to both Applicants independent and dependent claims.

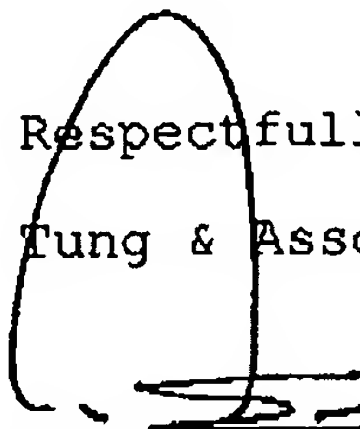
The Claims have been further amended to further clarify Applicants invention. A favorable reconsideration of Applicants' claims is respectfully requested.

Based on the foregoing, Applicants respectfully submit that the Claims are now in condition for allowance. Such favorable action by the Examiner at an early date is respectfully solicited.

In the event that the present invention as claimed is not in condition for allowance for any reason, the Examiner is respectfully invited to call the Applicants' representative at his Bloomfield Hills, Michigan office at (248) 540-4040 such that necessary action may be taken to place the application in a condition for allowance.

Respectfully submitted,

Tung & Associates



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